

(19) World Intellectual Property
Organization
International Bureau



(43) International Publication Date
19 February 2004 (19.02.2004)

PCT

(10) International Publication Number
WO 2004/014546 A1

(51) International Patent Classification⁷: **B01J 20/06**,
20/30, 23/72, C01B 3/16, C07C 31/04, 29/15

(21) International Application Number:
PCT/GB2003/003193

(22) International Filing Date: 28 July 2003 (28.07.2003)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
0218785.4 13 August 2002 (13.08.2002) GB

(81) Designated States (*national*): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(84) Designated States (*regional*): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

(71) Applicant (*for all designated States except US*): **JOHNSON MATTHEY PLC** [GB/GB]; 2-4 Cockspur Street, Trafalgar Square, London SW1Y 5BQ (GB).

(72) Inventor; and

(75) Inventor/Applicant (*for US only*): **KELLY, Gordon, James** [GB/GB]; 1 Beech Rise, Darlington, County Durham, DL1 3TQ (GB).

(74) Agents: **GIBSON, Sara, Hillary, Margaret et al.**; Intellectual Property Department, Johnson Matthey Catalysts, PO Box 1, Belasis Avenue, Billingham, Cleveland TS23 1LB (GB).

Published:

— with international search report

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: COMBINATION OF A GUARD BED AND A COPPER-CONTAINING CATALYST BED

(57) **Abstract:** A catalyst bed combination comprising a bed of a particulate copper-containing catalyst and, upstream of the catalyst bed, a guard bed in the form of shaped units formed from lead oxide particles and a particulate support material. The guard bed extends the life of the copper catalyst by absorbing halide contaminants in the process stream.

WO 2004/014546 A1

INTERNATIONAL SEARCH REPORT

PCT/GB 03/03193

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 B01J20/06 B01J20/30 B01J23/72 C01B3/16 C07C31/04
C07C29/15

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 B01J C01B C07C

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, COMPENDEX, INSPEC

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 01 17674 A (WATSON MICHAEL JOHN ; ICI PLC (GB)) 15 March 2001 (2001-03-15) cited in the application page 2, line 15 - line 16 examples 3,8; tables 1,2 claims	1-9
P, X	WO 02 066156 A (WATSON MICHAEL JOHN ; ICI PLC (GB)) 29 August 2002 (2002-08-29) page 2, line 10 - page 4, line 15 example 6; table 2	1-9
A	US 4 849 576 A (NOWACK GERHARD P ET AL) 18 July 1989 (1989-07-18) column 4, line 25 - line 42	1-8
	--- -/-	

☒

Further documents are listed in the continuation of box C.

☒

Patent family members are listed in annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search

30 September 2003

Date of mailing of the international search report

07/10/2003

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
Fax: (+31-70) 340-3016

Authorized officer

Gosselin, D

INTERNATIONAL SEARCH REPORT

PCT/GB 03/03193

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 4 849 577 A (BOITIAUX JEAN-PAUL ET AL) 18 July 1989 (1989-07-18) column 2, line 59 -column 3, line 40 -----	1-8
A	US 2001/027939 A1 (DIDILLON BLAISE ET AL) 11 October 2001 (2001-10-11) paragraphs '0013!-'0016! -----	1-8
A	GB 1 357 335 A (ICI LTD) 19 June 1974 (1974-06-19) the whole document -----	1-9

INTERNATIONAL SEARCH REPORT

PCT/GB 03/03193

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
WO 0117674	A	15-03-2001	AT 245482 T AU 6460700 A BR 0013634 A CA 2381147 A1 CN 1372491 T CZ 20020808 A3 DE 60004069 D1 EP 1210175 A1 WO 0117674 A1 HU 0203237 A2 JP 2003508214 T NO 20021078 A SK 3202002 A3 US 2002128329 A1	15-08-2003 10-04-2001 30-04-2002 15-03-2001 02-10-2002 17-07-2002 28-08-2003 05-06-2002 15-03-2001 28-01-2003 04-03-2003 03-05-2002 02-07-2002 12-09-2002
WO 02066156	A	29-08-2002	WO 02066156 A1	29-08-2002
US 4849576	A	18-07-1989	NONE	
US 4849577	A	18-07-1989	FR 2619120 A1 AT 68457 T CN 1031557 A ,B DE 3865578 D1 EP 0302771 A1 FI 883681 A ,B, JP 1066291 A JP 2591663 B2 KR 9306815 B1	10-02-1989 15-11-1991 08-03-1989 21-11-1991 08-02-1989 08-02-1989 13-03-1989 19-03-1997 24-07-1993
US 2001027939	A1	11-10-2001	FR 2806092 A1 CN 1312348 A	14-09-2001 12-09-2001
GB 1357335	A	19-06-1974	BE 770356 A1 CA 945738 A1 DE 2136746 A1 FR 2103196 A5 NL 7110096 A US 3922337 A	24-01-1972 23-04-1974 06-04-1972 07-04-1972 25-01-1972 25-11-1975